PATENT

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In the Matter of the Application of:	Larry E. Maple
Serial No.:	10/674,231
Filed:	September 29, 2003
Entitled:	REDUCING BATTERY TERMINAL CONTACT RESISTANCE STEMMING FROM INSULATION CONTAINMENT LAYER ON SAME (AS AMENDED)
Docket No.:	10970672-4

Group Art Unit: 1894
Examiner: Wills, Monique M.

Mail Stop: Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF PURSUANT TO 37 C.F.R. § 41.37

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I. REAL PARTY IN INTEREST

The real party in interest is Hewlett-Packard Company of Palo Alto, California. Hewlett-Packard Company derives its rights in this application by virtue of assignment of the application by the inventor to Hewlett-Packard Company.

II. RELATED APPEALS AND INTERFERENCES

There is currently a pending appeal for U.S. Patent Application No. 10/667,531, filed on February 22, 2006, which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Originally filed claims:	1-20.
Added claims:	21-42.
Claim cancellations:	1-27, 29, 38-42.
Presently pending claims:	28 and 30-37.
Presently appealed claims:	28 and 30-37

Claims 28 and 30-37 have been at least twice rejected and, therefore, are subject to appeal.

IV. STATUS OF AMENDMENTS

All Amendments have been entered.

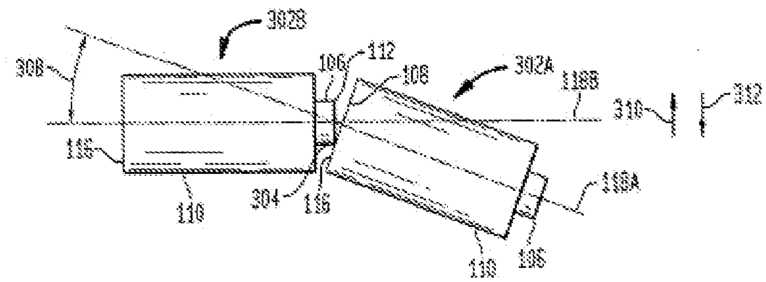
V. SUMMARY OF CLAIMED SUBJECT MATTER

A well-documented problem with standard dry-cell, miniature and other types of batteries is that over time surface contaminants such as oxide, sulfide and corrosive films form on the terminals of the battery. Such an insulating contaminant layer increases battery contact resistance, consuming battery power. This results in the rapid depletion of the installed batteries, decreasing device availability and increasing the rate at which the batteries need to be replaced or recharged. Furthermore, such a high contact resistance decreases the maximum current available from the installed batteries. Aspects of the present invention are directed to minimizing battery-to-battery and battery-to-device contact resistance by rupturing and/or removing an insulating contaminant layer disposed on battery terminals that contact each other and/or that contact the contacts of a battery compartment.

For example, in accordance with the invention of claim 28, a battery-powered device 1200, such as that depicted in Figure 12, comprises a battery compartment 1212 with positive and negative contacts disposed therein. The battery-powered device also comprises a means, such as coiled spring contact 600 (Figure 6), spring 700 (Figure 7) for rupturing an insulating contaminant layer disposed on portions of at least one terminal of at least one battery installed in the battery compartment. See e.g. paras. [0056]-[0067]; see also paras. [0035]-[0037].

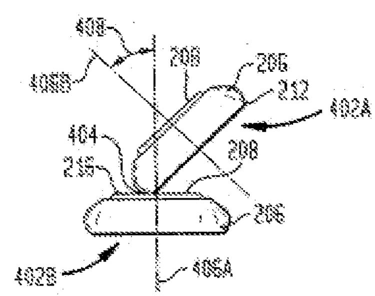
Disclosed embodiments include battery compartments in which two or more standard dry cell or miniature batteries are arranged with their respective longitudinal axes intersecting at an angle which causes the batteries to contact each other with a minimal accessible surface area of at least one of the terminals, such as the edge of a positive terminal button of a dry cell battery or an edge of the positive casing of a miniature battery.

Fig. 3 of Applicant's Application



In Applicant's Figure 3, reproduced to the left, two dry cell batteries 302A and 302B are arranged such that their longitudinal axes 118A and 118B intersect each other at a predetermined angle 308 such that a terminal contact point 304 of positive terminal edge 112 is the only point of contact between positive terminal 106 of battery 302B and negative terminal 108 of battery 302A. Angle 308 ranges from an angle greater than that at which planar surfaces 114, 116 are parallel with each other, as in conventional arrangements (that is, zero degrees), and an angle less than that at which casings 110 contact each other and cause the separation of terminals 106, 108 (which varies with the dimensions of dry cell batteries 100).

Fig. 4 of Applicant's Application



In the miniature battery arrangement illustrated in Figure 4, reproduced to the right, two miniature batteries 402A and 402B are arranged such that their longitudinal axes 218A and 218B intersect each other at a predetermined angle 408 such that a terminal contact point 404 positive terminal edge 212 is the only point of contact between positive terminal 206 of battery 402B and negative terminal 208 of battery 402A. Angle 408 ranges from an angle greater than that at which planar surfaces 214, 216 are parallel with each other (that is, zero degrees), and an angle less than 90 degrees.

Examples of such battery compartments are provided in Applicant's application. See, for example, Figures 8, 9, 10, 11A and 11B, and the associated description at pages 17 through 23 of Applicant's application.

By reducing the area of contact between neighboring contact surfaces a significant localized contact pressure between neighboring batteries 100, 200. This contact pressure is significantly greater that the contact pressure provided by conventional battery arrangements subject to the same compression force. The high pressure contact point ruptures an insulating contaminant layer on terminals 106, 108, 206 and 208, decreasing the contact resistance otherwise provide by such contaminant layers. In certain embodiments, the contact resistance between the installed batteries and the device contacts is also reduced in a similar manner.

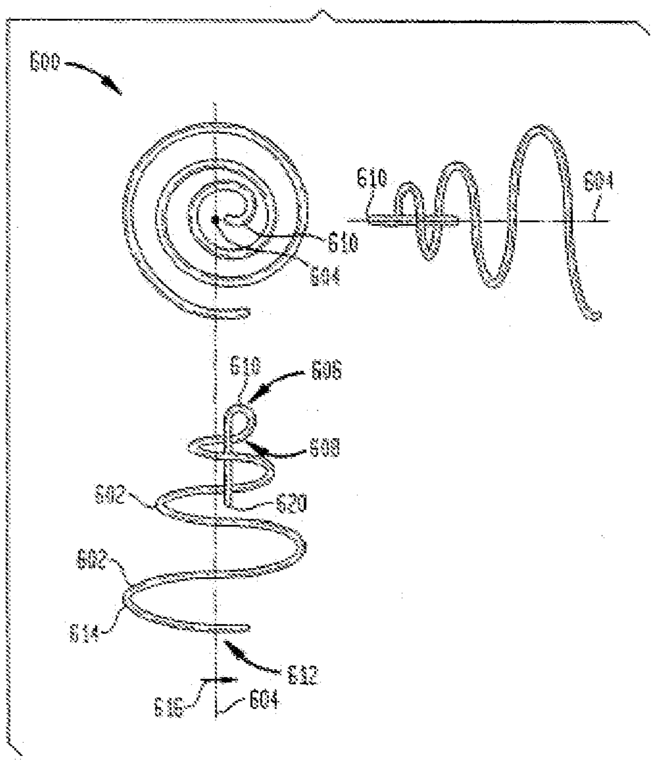
Preferably, to facilitate the penetration of the insulating contaminant layer the battery compartment also imparts a relative lateral motion between adjacent batteries and/or adjacent battery and device contact when the batteries are installed in the battery compartment. This is illustrated with arrows in Figures 3 and 4. Referring to Figure 3, one battery 302 can move in the direction of arrow 310 or 312 while the other battery 302 remains stationary or moves in the opposing direction 310, 312. In such aspects of the invention, the insulating contaminant layer disposed on the terminals is broken or otherwise penetrated by the resulting contact wiping action and removed from the local area.

Such a battery compartment is configured such that the batteries are serially-aligned and the device contacts are on opposing ends of the installed batteries. The distance between the opposing polarity device contacts is less than that of the total length of batteries that are installed therebetween. When the batteries are installed in the battery compartment, the batteries are pressed against the device contacts. The device contacts undergo elastic deformation providing the space necessary to enable the batteries to be installed in the battery compartment. Thereafter, the device contacts apply a spring force along the longitudinal axis of the batteries when the batteries are in their installed position in the battery compartment. This spring force forces the batteries against each other, insuring the terminal-to-terminal and the terminal-to-device contacts are maintained. Such a relative lateral movement can be invoked during installation or at other subsequent times, such as in response to the activation of a mechanical switch, depending on the embodiment and application.

Disclosed embodiments of the claimed invention also include coiled spring battery contacts for use in a battery compartment. The coiled spring contacts are configured with an upper end turn with one or more terminal contact regions each having a minimal surface area for contacting a terminal of an abutting battery. The contact region(s) each provide, for a given compression force, a contact point that imparts a pressure sufficient to rupture an insulating contaminant layer on the abutting battery terminals.

Preferably, the conical coiled spring contact has an axis of rotation defined by the windings with the terminal contact point(s) laterally offset from the axis. This causes regions of the windings in this lateral direction to compress more that other regions of the windings in response to an axial compression force applied by an abutting battery. This in turn causes the terminal contact point(s) to shift further in the lateral direction as the contact spring is compressed. As this occurs, the terminal contact point(s) scrape against the terminal of the installed battery, substantially removing any insulating contaminant layer disposed on the battery terminal.

Fig. 6 of Applicant's Application



For example, in the embodiment illustrated in Applicant's Figure 6, reproduced to the left, a coiled spring contact 600 reduces or eliminates contact resistance between a battery terminal and conical coiled spring contact 600 by providing a high pressure contact point and, preferably, a contact wiping action that ruptures, scrapes or otherwise removes an insulting contaminant layer on an abutting battery terminal has an upper end turn 608 that is bent to form a terminal contact region 610 for contacting negative terminal 108, 208 of dry

cell batteries 100 or miniature batteries 200. Contact region 610 provides, for a given compression force, a contact point that imparts a pressure sufficient to rupture an insulating contaminant layer on the abutting battery terminals. Furthermore, contact point 610 is eccentric; that is, it is spaced laterally from axis 604 of conical coiled spring 600. As a result, as a battery 100, 200 compresses conical coiled spring contact 600, contact point 610 shifts laterally from its shown position in the direction of eccentricity 616. This imparts a lateral sliding motion against the abutting battery terminal that scrapes away a substantial portion of any existing insulating contaminant layer. In addition, as noted, contact point 610 thereafter provides a contact point that imparts a pressure sufficient to rupture any remaining insulating contaminant layer.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether the Examiner improperly rejected independent claim 28 as being anticipated by U.S. Patent No. 5,050,053 to McDermott ("*McDermott*" herein) when *McDermott* neither discloses, teaches nor suggests "means for rupturing an insulating contaminant layer disposed on portions of at least one terminal of at least one battery installed in the battery compartment."

2. Whether the Examiner improperly rejected dependent claim 33 as being anticipated by *McDermott* when *McDermott* neither discloses, teaches nor suggests "means for removing an insulating contaminant layer disposed on the portions of said battery terminals that contact an abutting terminal."

VII. ARGUMENT

The following arguments address claims 28 and 33 based on the similarity of the rejections levied by the Examiner and/or by the similarity of the Applicant's basis for traversing such rejections. Claims 28 and 33, however, recite entirely different limitations which are independently patentable.

Claim 28 recites "[a] battery-powered device comprising: a battery compartment ...; and means for rupturing an insulating contaminant layer disposed on portions of at least one terminal of at least one battery installed in the battery compartment. (*See*, Applicant's claim 28, below.)

Claim 33 depends from claim 28, and recites "wherein the rupturing means comprises: means for removing an insulating contaminant layer disposed on the portions of said battery terminals that contact an abutting terminal." (*See*, Applicant's claim 33, below.)

In the Office Action mailed November 21, 2005, the Examiner rejected independent claims 28 and 33 under 35 U.S.C. § 102(b) as being anticipated by *McDermott.* Acknowledging that McDermott fails to expressly teach or suggest each and every element of claims 28 and 33, the Examiner asserts that McDermott inherently teaches a "means for rupturing an insulating contaminant layer" as recited in Applicant's claim 28 and a "means for removing an insulating contaminant layer" as recited in Applicant's claim 33.

Specifically, the Examiner makes the unsupported assertions that, "[a]s to the limitation [of claim 28] for rupturing an insulating contaminant layer disposed on portions of one or more abutting battery terminals, the coiled spring contact [of *McDermott*] is <u>capable of performing said function</u>" and "the limitation [of claim 33] for removing an insulating contaminant layer disposed on the portions of the battery terminals that contact each other, the spring contact [of *McDermott*] is <u>capable of performing said function</u>." See, Office Action, pg. 5 (emphasis added). The Examiner summarizes the rejection of these two claims with the conclusion that "<u>it is reasonable to expect that a spring capable of holding a battery in place has sufficient compression strength to rupture [and remove] an insulating layer</u>." See, Office Action, page 7 (emphasis added).

For at least the reasons set out below, Applicant respectfully asserts that these grounds of rejection are misplaced, leaving the Office Action without a *prima facie* rejection of claims 28 and 33. As such, the rejections of these claims are improper and should be reversed.

The Examiner has failed to show that McDermott anticipates Applicant's claims 28 and 33. Under 35 U.S.C. §102, claims are "anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." The Manual of Patent Examining Procedure ("MPEP") §2131 (8th Edition 2005); *Verdegaal Bros., Inc. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987); *See also Structural Rubber Pods. Co. v. Park Rubber Co.*, 749 F.2d 707, 715, 223 USPQ 1264 , 1270 (Fed. Cir. 1984).

"In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristics <u>necessarily flows from the teachings of the applied prior art</u>." MPEP §2112 (quoting Ex parte Levy, 17 USPQ2D 1461, 1464 (BD. Pat. App. & Inter. 1990). See also, *In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q. 1949, 1951 (Fed. Cir. 1999) ("To establish inherency, the evidence "must make clear that the missing descriptive matter is <u>necessarily present in the thing described in the reference</u>, and <u>that it would be so recognized by persons of ordinary skill</u>."). The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. (See, MPEP 2112, citing *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).) In *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991) the Court states that "[i]nherency ... may not be established by probabilities or possibilities. The mere fact that a certain thing <u>may result</u> from a given set of circumstances is not sufficient." (*Id.)*

The Examiner has failed to meet the burden required under these well-settled precedents.

McDermott discloses a penlamp flashlight design 10 is illustrated in Figures 7 and 8, reproduced to the below. An incandescent lamp 11 is retained in a movable socket 12 which may be reciprocally advanced in or out along the longitudinal axis of the conducting tubular flashlight case 13. This motion of the lamp 11 and socket 12 is further translated by the dry cell batteries 15 within the case 13 to effect compression of the helical coiled conducting spring 14 which is captured within the closed end of the case 13.

Fig. 7 of McDermott

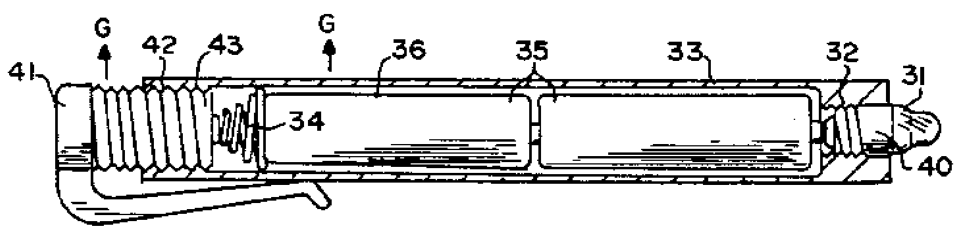
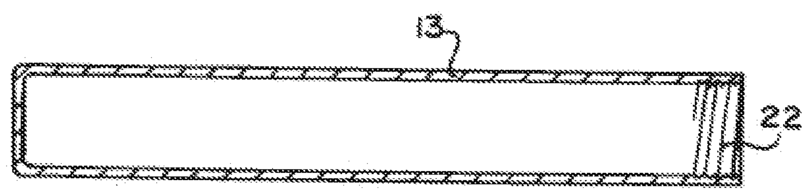


Fig. 8 of McDermott



Referring to Figures 5 and 6 of *McDermott*, reproduced below to the left and right, respectively, the helical spring 14 of *McDermott* has multiple turns of decreasing diameters where the largest diameter abuts the insulated casing 16 of the battery 15 and the smallest diameter is in contact with inner conducting surface of the case 13. With inward motion of

Fig. 5 of McDermott

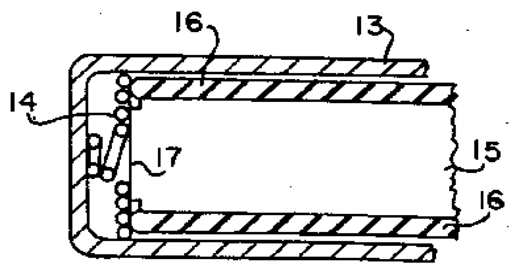
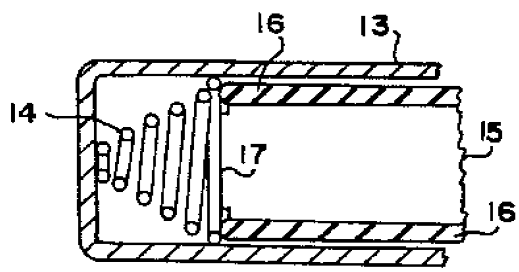


Fig. 6 of McDermott



the combination of the lamp 11, the socket 12, and the batteries 15 successive turns of the conical coiled helical spring 14 are collapsed upon the conducting negative base 17 of the battery 15. Thus with the lamp terminal 18 in contact with the positive post 19 of the battery 15, an electrical circuit is completed from the battery base 17 through multiple turns of the spring 14 to the conducting case 13, thence through the conducting socket 12 to the base 20 of the lamp 11. (*See*, McDermott, col. 4, lns. 14-46.)

As noted in *McDermott,* the ability of the coiled sprint 14 to reduce contact resistance is derived not by reducing the contact area as in the exemplary embodiments of Applicant's claimed invention, but rather by increasing the surface area of the coiled spring 84 that comes into contact with the battery terminal. (*See*, *McDermott*, col. 7, lns. 1-5.) Specifically, the multiple turns of the *McDermott* coiled spring 84 "collapse upon the battery return surface 57." (*See*, *McDermott*, col. 4, lns. 56-68.)

Thus, a reasonable reading of McDermott fails to reveal that either the claimed "means for rupturing" or the claimed "means for removing" are inherent features of the McDermott device. Specifically, the Examiner has failed to provide any basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristics necessarily flows from the teachings of the applied prior art." See, MPEP §2112, Ex parte Levy, 17 USPQ2D 1461, 1464 (BD. Pat. App. & Inter. 1990), and *In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q. 1949, 1951 (Fed. Cir. 1999).

With regard to the "means for rupturing" claim limitation, the increase surface area of the McDermott spring contact that comes into contact with the installed battery does not necessarily rupture the contaminant layer on the battery terminal. There is no mention of any feature, applied pressure, or other characteristic of the McDermott spring contact provided in McDermott that indicates that McDermott's spring contact necessarily ruptures a contaminant layer on the battery terminal.

With regard to the "means for removing" claim limitation, the coil spring of the McDermott device has its largest diameter abutting the insulated casing 16 of the battery while the smallest diameter contacts either the inner conducting surface of the casing, or a control plug and pocket clip 41. As the end of the light is turned the spring windings collapse on the negative terminal of the battery on which it is resting. (*See,* McDermott, col. 4, lns. 14-46.) Therefore, the windings of the spring resting on the battery have no need for movement once they contact the negative terminal, but rather remain stationary while the end of the spring having the smallest diameter moves directly toward the battery. Since McDermott decreases contact resistance by increasing the surface area of the spring that contacts the battery, any lateral movement of the spring could bring it out of maximum contact with the battery, thereby negating the stated benefit of McDermott of reducing contact resistance. Lateral movement would therefore be contradictory to the teachings of the McDermott patent. Nor is there any other disclosure that indicates that any contaminant layer on the battery contacts are necessarily removed by the McDermott device.

As noted, Examiner makes the unsupported assertions that, "[a]s to the limitation [of claim 28] for rupturing an insulating contaminant layer disposed on portions of one or more abutting battery terminals, the coiled spring contact [of *McDermott*] is capable of performing said function" and "the limitation [of claim 33] for removing an insulating contaminant layer

disposed on the portions of the battery terminals that contact each other, the spring contact [of *McDermott*] is capable of performing said function." See, Office Action, pg. 5 (emphasis added). The Examiner summarizes the rejection of these two claims with the conclusion that "it is reasonable to expect that a spring capable of holding a battery in place has sufficient compression strength to rupture [and remove] an insulating layer." See, Office Action, page 7 (emphasis added). This basis of rejecting claims 28 and 33 contradicts settled caselaw and PTO mandates, as indicated above.

In fact, this very rationale was rejected by the courts in the decision by the Federal Circuit in *Robertson*. *See* 169 F.3d at 745. In *Robertson*, 169 F.3d at 745, the Board of Patent Appeals originally held that a diaper having two fastening devices inherently disclosed all elements of a claim directed to a mechanical fastening device comprising three fastening means. The Board upheld the inherency rejection on the grounds that the two fastening devices of the prior art "were capable of being intermingled to perform the same function as the third and first fastening elements" in the claimed invention. *Id.* The Federal Circuit reversed the Board and noted that fact that the devices were merely "capable of being" used for the same function is not sufficient to show that the later device was inherently disclosed by the prior art. *Id.* In fact, the Federal Circuit noted that this type of analysis "rests upon the very kind of probability or possibility… that this court has pointed out is insufficient to establish inherency" and makes no attempt to show that the third fastening element was necessarily disclosed by the prior art. *Robertson*, 169 F.3d at 745.

Applicant asserts that the Examiner's rejection of claim 28 is similar to the rejection in *Robertson* because both rejections are based "upon the very kind of probability or possibility… that… [the Federal Circuit] has pointed out is insufficient to establish inherency." 169 F.3d at 745. The Examiner's assertion that "it is reasonable to expect that a spring capable of holding a battery in place has sufficient compression strength to rupture an insulating layer" is completely "probability or possibility" because evidence has been provided to show that McDermott inherently has "means for rupturing" or "means for removing" an insulating contaminant layer. See In *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991) ("[i]nherency … may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.")

Accordingly, the only inherent operation which can be derived from McDermott is that the compressible coiled spring is capable of performing the purpose intended by McDermott; that is, to provide adequate surface contact area so that an electrical connection may be established with an installed battery. There is no express, implicit or inherent disclosure in McDermott regarding a feature or characteristic of the McDermott device that indicates that it necessarily ruptures or removes an insulating contaminant layer on the terminal surface of an installed battery.

For at least the above reasons, Applicant respectfully asserts that the rejection of claims 28 and 33 are improper and should be reversed. Applicant further submits that the pending claims define patentable subject matter. Accordingly, Applicant request that the Examiner's rejection of these claims be reversed and that the pending application be passed to issue.

Respectfully submitted,

Dated: July 23, 2007

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VIII. CLAIMS APPENDIX

28. A battery-powered device comprising:

a battery compartment with positive and negative contacts disposed therein; and

means for rupturing an insulating contaminant layer disposed on portions of at least one terminal of at least one battery installed in the battery compartment.

30. The device of claim 28, wherein the rupturing means comprises:

a battery case constructed such that a curved edge of the terminal of a first installed battery is in contact with a planar terminal surface of an abutting second installed battery or an abutting device contact; and

means for urging the first installed battery toward the second installed battery or the device contact such that the curved edge of the terminal applies a pressure sufficient to rupture the insulating contaminant layer disposed on the surface of the abutting terminal of the second installed battery or abutting device contact.

31. The device of claim 30, wherein the means for urging the installed batteries toward each other comprises:

at least one device contact disposed in the battery case that applies a spring force along the longitudinal axis of the batteries when the batteries are in their installed position in the battery compartment.

32. The device of claim 28, wherein the rupturing means comprises:

a coiled spring battery contact disposed at one end of the battery compartment, the contact comprising a plurality of concentric windings with a terminal contact point on the upper end turn thereof, the terminal contact point configured to contact an abutting battery terminal surface, the coiled spring contact applying a spring force to an installed battery sufficient to cause the terminal contact point to rupture an insulating contaminant layer on the abutting battery terminal surface.

33. The device of claim 28, wherein the rupturing means comprises:

means for removing an insulating contaminant layer disposed on the portions of said battery terminals that contact an abutting terminal.

34. The device of claim 33, wherein the removing means comprises:

a battery case constructed such that a curved edge of the terminal of a first installed battery is in contact with a planar terminal surface of an abutting second installed battery or an abutting device contact; and

means for imparting a relative lateral motion between the adjacent batteries and/or between the first installed battery and the device contact when the batteries are installed in the battery compartment, wherein such lateral movement is sufficient to remove at least a portion of the insulating contaminant layer on the surface of the abutting battery terminal or device contact.

35. The device of claim 34, wherein the means for imparting a relative lateral motion comprises:

a coiled spring battery contact comprising a plurality of concentric windings defining an axis of rotation and having a terminal contact point eccentrically located on an upper end turn of the concentric windings, wherein during battery installation the coiled spring contact compresses to cause the terminal contact point to laterally shift in the direction of eccentricity to provide a contact wiping motion against the abutting battery terminal surface with a pressure sufficient to remove the contaminant layer from the terminal surface.

36. The device of claim 34, wherein the means for imparting a relative lateral motion comprises:

the battery compartment configured such that a distance between device contacts disposed on opposing ends of the battery compartment is less than the length of the serially aligned batteries, wherein a spring force applied by the device contacts to compress the batteries against each other can be overcome by a force applied to a partially installed second battery that causes a relative lateral movement between the second battery and a previously installed first battery.

37. The device of claim 28, wherein the battery compartment is implemented in a hand-held scanner.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.